1881MNRAS..41..312K

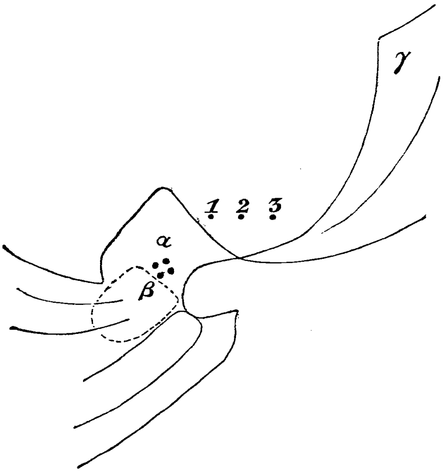
A step-ladder built to conform to the radius of the telescope and provided with a sliding seat similar to the one described, could be mounted on tracks so as always to be at the right distance from the telescope, but we doubt whether it would be as convenient as one free to move over the floor in any direction.

Chicago, U.S.A.
1880, *December.*

Note on the comparative Brightness of the Nebula of Orion.

By E. B. Knobel, Esq.

At the January meeting of this Society a photograph of the Nebula of *Orion*, by Dr. H. Draper, was exhibited, and remarks were made upon it which appear to require a slight correction. It was stated by Mr. Ranyard that, "comparing the photograph with the drawings of Bond, Secchi, Liapounov, and others, it corresponds with none of them. The most curious difference is the little bright nucleus preceding the trapezium, which is the brightest part in the photograph, but that is not the case in *any* of the drawings." And further the remark was made that "Dr. Draper's photograph shows that a nebulous mass on the preceding side of the trapezium is the brightest region of the nebula. This does not correspond with any of the drawings."



In the engraving of Bond's drawing which I possess, the brightest portion of the nebula appears certainly to be the mass on the preceding side of the trapezium; and in one of the most recent and carefully executed drawings of this nebula, by M. Trouvelot, made with the 26-inch Equatoreal, and published in the "Description of the Instruments of the United States Naval Observatory, Washington, 1876," the portion of the nebula preceding the trapezium is shown very considerably brighter than

1881MNRAS..41..312K

any other part of it, confirming Bond's drawing and Dr. Draper's photograph.

I have endeavoured to make a few photometric observations for the purpose of determining the brightest portion of this nebula. With that object I have employed an $8\frac{1}{2}$-inch silvered glass reflector with an *unsilvered* glass flat. The light is thus very considerably reduced; and then by applying the limiting-aperture astrometer, described in *Monthly Notices*, vol. xxxv. p. 100, I am able to extinguish successively every portion of the nebula, and by this means obtain an approximation to the light-ratio of its several masses.

Bad weather has prevented my securing very many results, as it is so necessary that such observations should not be undertaken except on very fine, clear nights. The power used was 120.

1881, Feb. 28. Fine clear night. Seeing good from 7 to 9 P.M.

Aperture $8\frac{1}{2}$ inches. The portion of the nebula of *Orion* surrounding the ray marked γ in the diagram is faintly visible.

Aperture 4·92 inches. The ray γ extinct. The limiting aperture for γ was not determined, but the ray could not now be glimpsed.

The only nebula visible consists of the central portions marked α and β. The portion β extends north preceding the trapezium rather more than the distance from Star 1 to the trapezium, and at an average position angle of 340° or 350°, as roughly indicated by the dotted line in the woodcut.

Aperture 3·37 inches. Nebula faintly visible to nearly the same extent as in the preceding observation. Portion α much fainter than β.

Aperture 3·01 inches. Star 3 faintly visible.

Aperture 2·52 inches. Star 3 extinct. Portion α of nebula seen by averted vision. The only nebula visible directly, stretches from the trapezium in a north preceding direction.

Aperture 2·10 inches. Portion α of nebula extinct. A slight haze visible north preceding the trapezium.

Aperture 1·67 inches. All nebula extinct by direct vision, a very slight haze glimpsed by averted vision at the spot marked by the letter β.

Aperture 1·33 inches. Not a trace of any nebula or haze.

March 8, 7 P.M. to 8.30. Fine and clear, no haze. Moon 8 days old.

Apertures $8\frac{1}{2}$, 4·92, and 3·37 inches confirm the observations of Feb. 28.

1881MNRAS..41..312K

Aperture 2·65 inches. Portion α of nebula is glimpsed by averted vision. The only nebula visible looking direct is the part marked β.

Aperture 1·82 inches. Portion α of nebula extinct. β faint.

Aperture 1·46 inches. Star 3 extinct; only two stars seen in trapezium. Slight haze on north preceding side of trapezium.

Aperture 0·91 inches. Nebula quite extinct; only one star distinctly seen in trapezium. Star 2 seen with difficulty.

For comparison, the objects not differing much in altitude, I made the following observations of the *Andromeda* nebula, power used being 80:—

March 8.

Aperture $8\frac{1}{2}$ inches. The nucleus of the nebula is round and bright, like Trouvelot's drawing in the Harvard College Series.

Aperture 2·46 inches. The only nebula visible is a small round luminous spot, the diameter of which is about one-half that seen with $8\frac{1}{2}$ inches aperture.

Aperture 1·95 inches. Nebula absolutely extinct. No glimpse of it by any means.

The mass α disappears uniformly, without apparently diminishing in extent; but the dotted portion, marked β, becomes smaller as the light is reduced, the brightest part being at the position marked in the diagram by the letter β.

In the above observations, it should be noted that the actual apertures which would extinguish the portions of the nebulæ referred to, are probably greater than those I have given, my object being to proceed by wide steps so as to be able to say with certainty that with one aperture the object was visible, and with the second aperture the object was not visible. It would have required many more observations than it was possible for me to make, to determine the exact aperture when each feature became extinct.

If we assume for the purpose of a rough approximation, that 1·8 in. and 1·3 in. are the limiting-apertures respectively of portions α and β of the nebula of *Orion*, then these will give a light ratio of 0·5216. And comparing the nebula of *Orion* with that in *Andromeda* in the same way, we have rough limiting-apertures of 1·33 in. for the former, and 1·95 in. for the latter, which give a light-ratio of 0·4652.

Though these figures must be received with caution, we may, I think, place more confidence in the proof that the central portion of the nebula of *Orion* preceding the trapezium is considerably brighter than that on the following side; and that the nebula in *Andromeda*, though so conspicuous to the naked eye, is decidedly less bright than the central portion of that in *Orion*.

I venture to think that this class of observation affords a far